RTCA Special Committee 209

ATCRBS / Mode S Transponder

Meeting #3

RTCA, Washington DC
8 – 9 August 2006

Consolidated Set of Comments Received from the Review of the Proposed Appendix B for Mode S Specific Services from Action Item 2-5

Consolidated by Gary Furr
Presented by Peter Muraca

SUMMARY

This Working Paper represents a consolidation of all of the comments that have been received as a result of Action Item 2-5, which requested all members of SC-209 to review and comment on draft v1.1 of the proposed Appendix B, for the Mode S Specific Services. Revision 1 to this Working Paper represents the annotation of the original comments during Meeting #3 with resolutions or suggestions by SC-209.

CONSOLIDATED COMMENTS MATRIX
Proposed Appendix B for Mode S Specific Services – (draft v1.1)

REVISION 1 WITH ANNOTATIONS DURING MEETING #3 REGARDING RESOLUTIONS OR SUGGESTIONS FOR ADDITIONAL WORKING PAPERS

#	Reviewer Name/ Org./Office Symbol	Page No.	Paragraph #	COMMENT / RATIONALE	PROPOSED RESOLUTION(S)
1	Bob Grappel MIT	Various	Various	BDS register codes are sometimes given in hexadecimal notation (e.g., Table B-2-1) and other times in the "Eurocontrol" notation "a,b" where "a" and "b" are 4-bit hexadecimal numbers. Suggest making things consistent.	**Since it would involve fewer changes, revise Table B-2-1 (and any other place where the subscript notation is used) to use the 'comma" notation instead.** **SC-209 Agrees to allow the usage of "BDS 0,6" as well as "Register 06_{16}" notation as has been agreed to in ICAO SARPs documents. A note will be added to section B.3.**
2	Bob Grappel MIT	B7	Table B-2-2	Uplink channel 5 should be worded consistently with the other channel definitions.	**Word as "Reserved (TCAS Sensitivity Control)** **SC-209 Agrees to actually remove the word "Reserved" from in front of those channels that have applications assigned. This will apply to Tables B-2-2 and B-2-3.**
3	Bob Grappel MIT	B8	Table B-2-3	Downlink broadcast identifier 30 hex should be included (RA downlink).	**Add entry for downlink broadcast identifier 30 hex.** **SC-209 Agrees to add the entry.**
4	Bob Grappel MIT	B9	B.2.2.6.2	Suggest adding a reference to Table B-2-2 in the description of the MCH field.	**Add reference to Table B-2-2 in the description of the MCH field for both short and long formats.** **SC-209 Agrees to add the reference to Table B-2-2 in the short format and to add the definition of MCH in the long format section.**
5	Bob Grappel MIT	B11	B.3	Why are the meteorological register definitions (44 and 45 hex) suppressed here?	**Add the appropriate definitions for the meteorological registers (B-68 and B-69).** **SC-209 Agrees to add the definitions for both Registers 44_{16} and 45_{16}.**

CONSOLIDATED COMMENTS MATRIX
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6	Don Walker/ Honeywell	B-12	Table B-3-16 Note 1	Annex 10 is in flux constantly. This note needs to be very specific about what version of Annex 10 you are complying with. This comment goes for any reference to Annex 10 throughout.	**Add version # and publish date.** **SC-209 Agrees that a reference should be included at the beginning f B.3 to the current edition of ICAO Doc 9871.**
7	Don Walker/ Honeywell	B-12	Table B-3-16 Note 2	This bit has been hijacked from its original meaning by European SSR implementation. It is being used as a valid bit for the data in BDS 1,0. See attached comments from Eurocontrol below this table. The real meaning of this bit needs to be stated here and not the tripe that is in Annex 10 and this document.	**Set bit 25 to 1 as a constant. Loading register 10h is a basic transponder requirement.** **Bob Saffell and Don Walker are to try to craft the text of a proposed change.**
8	Don Walker/ Honeywell	B-13	Table B-3-16 Note 12	This field is still of dubious value. It should state exactly what capabilities associated with these document versions that these numbers apply to. We rarely implement all the requirements in a document and thus there is no magic number that will ensure a radio does everything that is assumed of it.	**Suggest a much more comprehensive table that states exactly what is implied by a particular version #. For instance, Version 3 seems to be meant to indicate that a radio has implemented the Enhanced Surveillance Registers 40h, 50h, and 60h. It certainly isn't clear from Annex 10 what this table means.** **SC-209 Agrees to add a column referencing DO-181D and ED-73C and to change "Edition 1" to reference ICAO Doc 9871.**
9	Don Walker/ Honeywell	B-13	Table B-3-16 Note 13,14	These fields are not dynamic.	**Add to notes: These fields represent the capability of the transponder and do not represent whether an ADLP is present.** **SC-209 Agrees that a working paper should be produced to the ICAO ASP TSG relating to UELM and DELM.**
10	Don Walker/ Honeywell	B-15	Table B-3-24	This chart could use some clarification on LSB and MSB.	**Suggest putting that white space to good use. Make a column for each register 18h to 1Ch. In each column, list the register numbers in the correct bit position. Makes it a whole lot clearer and easier on the guy writing the tests.** **SC-209 Agrees with this change.**

CONSOLIDATED COMMENTS MATRIX
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11	Don Walker/ Honeywell	B-16	Table B-3-29	This chart could use some clarification on LSB and MSB.	**Make a column for each register 1Dh to 1Fh. In each column list the channel # in the correct bit position.** **SC-209 Agrees with this change.**
12	Don Walker/ Honeywell	B-22	Table B-3-64	What is meant by note 1 with respect to manual control of the aircraft? Does that imply that the selected altitude be set invalid when the autopilot isn't engaged? That is not currently implemented in any Honeywell transponder.	**Suggest removing the wording "or the current aircraft altitude according to the aircraft's mode of flight (the intent may not be available at all when the pilot is flying the aircraft)." Suggest marking bit 55-56 encoding as Unknown.** **SC-209 Agrees that a working paper should be produced with a proposed change for this comment.**
13	Don Walker/ Honeywell	B-25	Table B-3-67	None of the fields in this register are on the FMS Trajectory bus defined in ARINC 702A Supplement 3.	**Suggest re-evaluation of fields based on data that is available in ARINC 702A Supplement 3. All registers containing Trajectory data should be evaluated. Short of that they should be marked as reserved for Trajectory Data.** **SC-209 Agrees that a working paper should be produced with a proposed change for this comment.**
14	Don Walker/ Honeywell	B-29	Table B-3-82	FOM Source Coding really does not make sense. The RNP parameter does not indicate FOM. It indicates a maximum FOM requirement for a given flight leg. This value is meant to be encoded using HFOM from a GNSS sensor or ANP from and RNP FMS or HEPU from a legacy FMS.	**Rewrite note to indicate the proper source parameters for this field.** **SC-209 Agrees that a working paper should be produced with a proposed change for this comment.**
15	Don Walker/ Honeywell	B-29	Table B-3-82	Bits 42-56 should just represent GNSS altitude. Baro altitude is available in multiple registers already including register 51h.	**Suggest removing references to pressure altitude.** **SC-209 Agrees that a working paper should be produced with a proposed change for this comment.**

CONSOLIDATED COMMENTS MATRIX
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16	Don Walker/ Honeywell	B-30	Table B-3-83	This entire table is a duplicate of 60h.	**Suggest changing this entire register definition to reserved.** **SC-209 Agrees that a working paper should be produced with a proposed change for this comment, except for baro rate.**
17	Don Walker/ Honeywell	B-31	Table B-3-84	Time to Go is not on the FMS Trajectory bus defined in ARINC 702A Supplement 3.	**Suggest re-evaluation of fields based on data that is available in ARINC 702A Supplement 3.** **SC-209 Agrees that a working paper should be produced with a proposed change for this comment.**
18	Don Walker/ Honeywell	B-32	Table B-3-95	This entire register 5F is unnecessary.	**Suggest changing this entire register definition to reserved.** **SC-209 Agrees that a working paper should be produced with a proposed change for this comment.**
19	Don Walker/ Honeywell		General	All optional registers should be identified as such. All required registers should be identified as such.	**Required Basic registers: 00h, 10h, 20h, 17h,** **Required TCAS registers: 30h, 0Fh** **Required Enhanced registers: 40h, 50h, 60h, 18h, 19h, 1Ah, 1Bh, 1Ch, 1Dh, 1Eh, 1Fh** **SC-209 Agrees that a table will be generated in the Appendix.**
20	Bob Grappel MIT	Various	Various	I suggest adding the following register definitions: 4,4 and 4,5 and all of the Extended Squitter registers 0,5 through 0,A, which might also include 6,1 and 6,5.	**SC-209 Agrees that what we will do is insert a page with a title for the Extended Squitter registers and reference DO-260A.**

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21	Bob Grappel MIT	Various	Various	Your Appendix B draft does not include the definitions of the 6-bit character set used in registers 08, 20, 21, 25, 41, 54, 55, 56, E3, E4, and E5. You need to put the definition in your Appendix.	A 6-bit character encoding is employed for expressing alphanumeric strings in Mode S GICB registers that incorporates upper-case letters, decimal digits, and a space character. The encoding is described in RTCA DO-181C. Letters 'A' through 'Z' are encoded using values 1 through 26. Digits '0' through '9' are encoded using values 48 through 57. The space character is encoded as value 32. All other encoding values are undefined. **SC-209 Agrees to move the information to the beginning of B.3.**

From: LAW John [mailto:john.law@eurocontrol.int]
Sent: Wednesday, July 26, 2006 7:32 AM
To: Wilson, Kevin (CNS COE)
Cc: POTIER Eric
Subject: RE: Mode S Enhanced Surveillance

Kevin,

I discussed the question in your email with Eric Potier, and we came to the conclusion that there might be some misunderstanding or assumptions regarding the need for 'operational' determination of an 'EHS capable' aircraft (- note that there is a difference between 'capable' and 'compliant'). For Mode S operations the ground systems implemented in Europe do not need to specifically determine if the Mode S transponder is compliant with EHS (ie. providing the defined 8 DAPs). However, this can and will be done for monitoring purposes. The ground stations extract the EHS parameters provided in the manner described below:

At track initialisation and on any announced change:

If the transponder is a level 2 or above (CA field present in All Call replies >=4 – European mandate requires a level 2 or above transponder)

Then Aircraft Register 10 is extracted, if bit 25 of register 10 is set and if subnetwork version number is correct (bit 25 means “Mode S specific services capability”), then Register 17 is extracted to know which registers are currently supported by the platform. (Unfortunately the subnetwork version number is not always correctly set and second part of the test is overridden for the time being removing the protection to only use the right version!)

Periodically:

If bit 9 of register 17 is set then extract register 40 For all parameters of the register if parameter status is valid then extract airborne parameter and send it to ATC for further use

If bit 16 of register 17 is set then extract register 50. For all parameters of the register if parameter status is valid then extract airborne parameter and send it to ATC for further use

If bit 24 of register 17 is set then extract register 60. For all parameters of the register if parameter status is valid then extract airborne parameter and send it to ATC for further use.

This is compliant with ICAO Annex 10.

Use of the DAPs provided is then determined depending on which ATC application is locally supported (e.g. display of selected altitude to the controller). So the system allows extraction of any parameter even if not all of the DAPs required for European EHS are provided by the installation. The ATC users can choose to use them or not depending on what they need.
There is no bit to directly indicate EHS compliance (within the meaning of the European mandate) and it is not proposed that one should be required. Technically it is not necessary provided the airborne equipment follows what is defined in Annex 10, and now in ICAO Doc 9871.